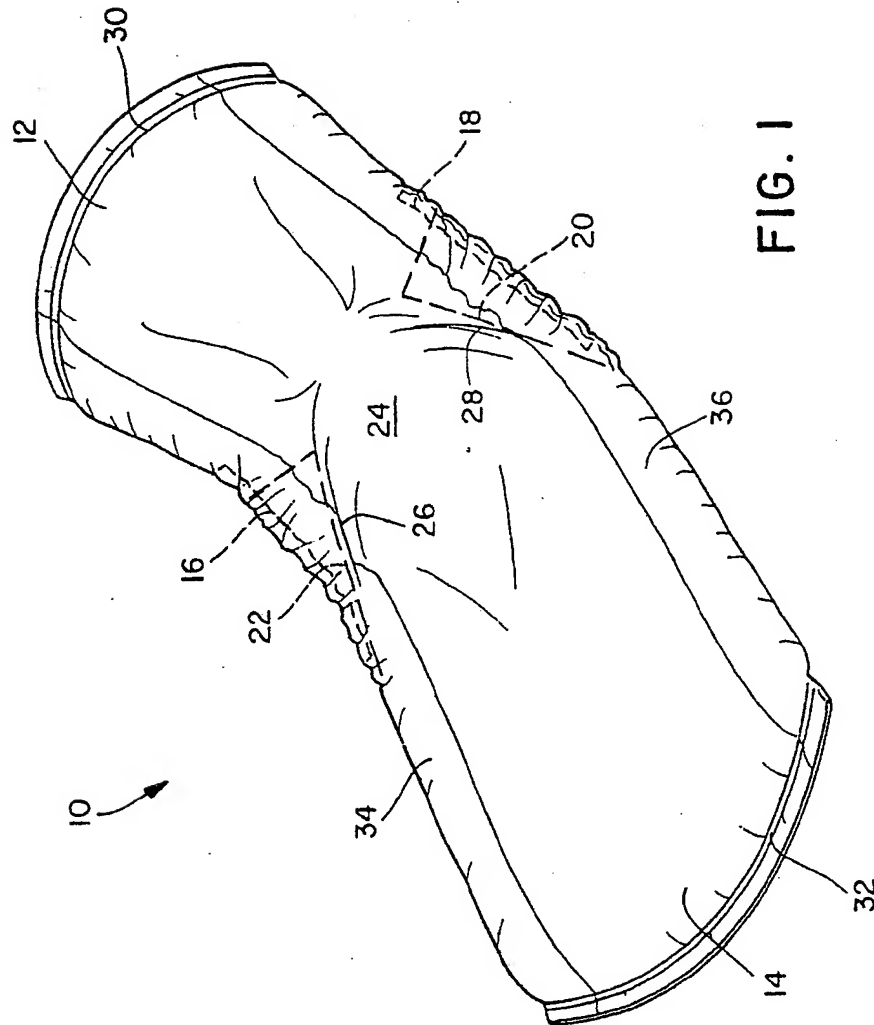


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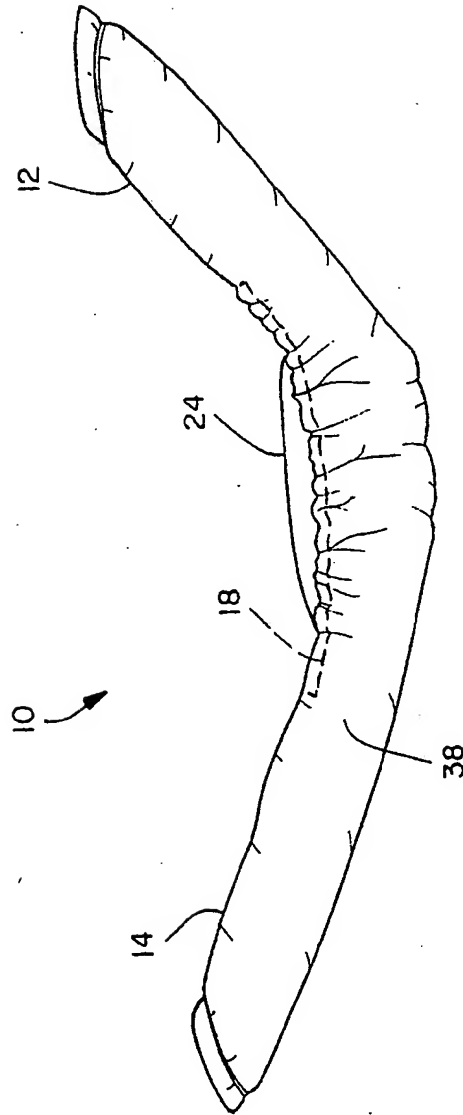
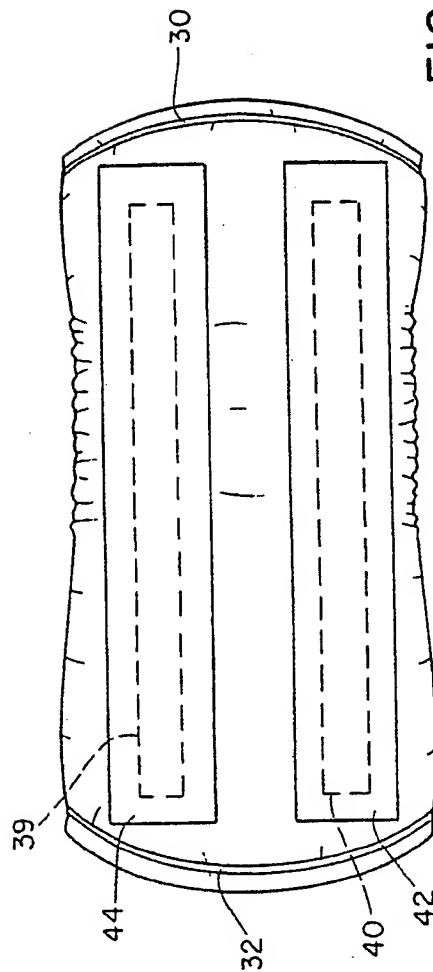


FIG. 2



FIG. 4



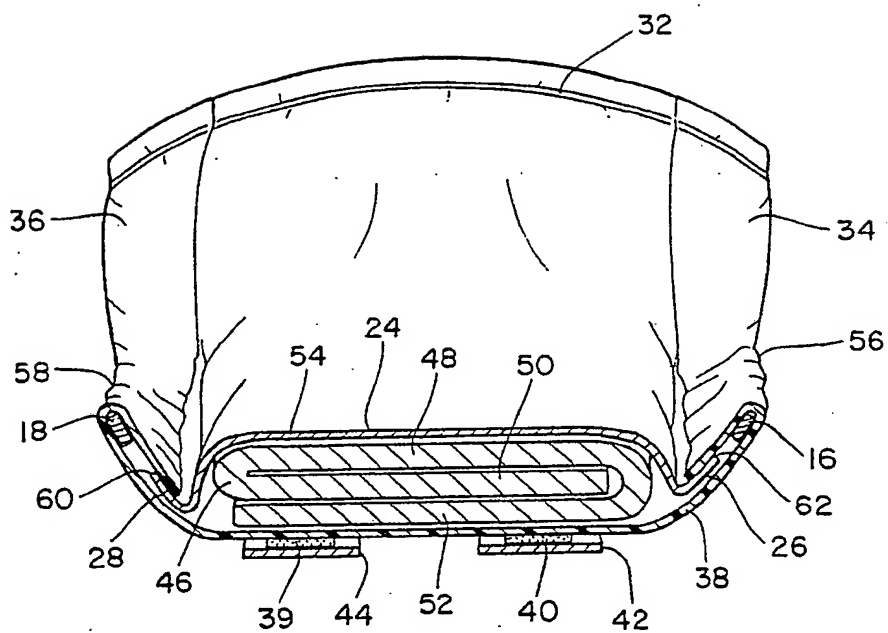


FIG. 5

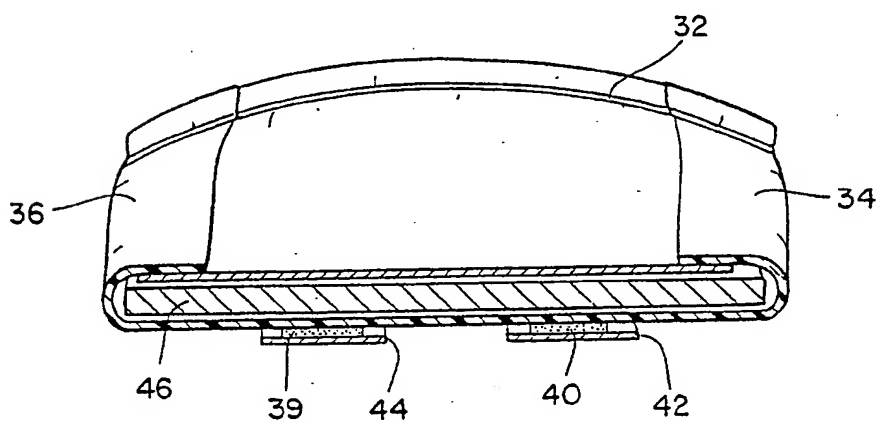


FIG. 6

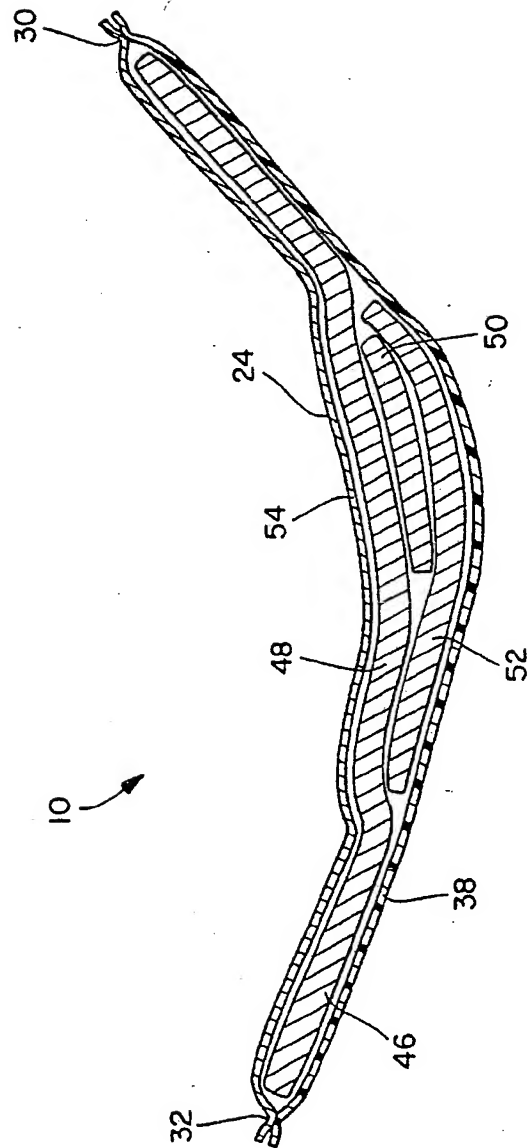
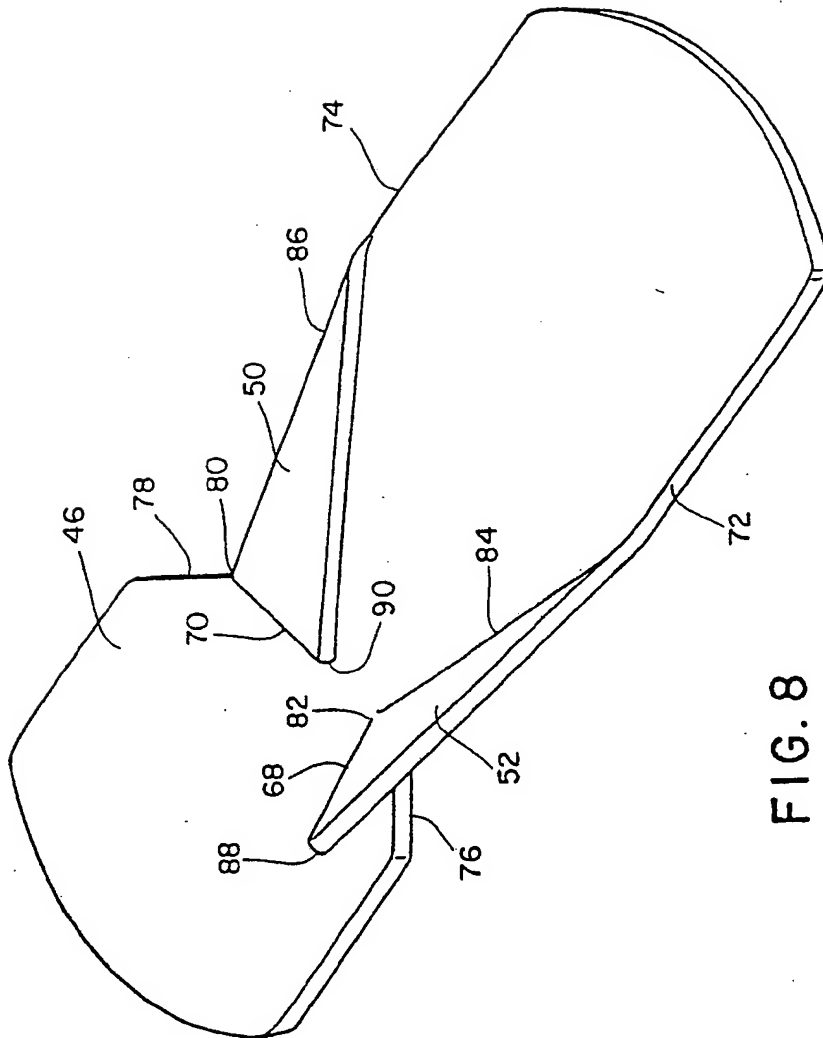


FIG. 7



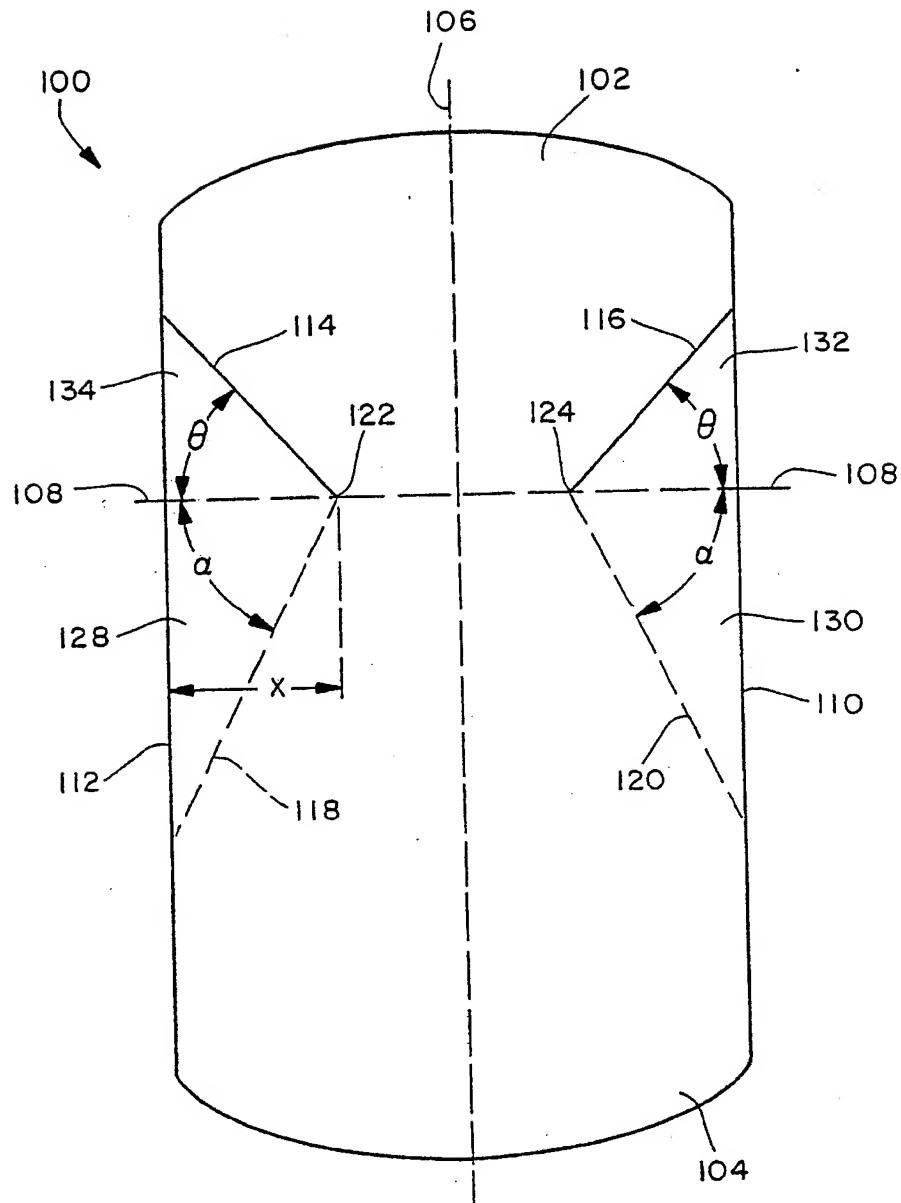
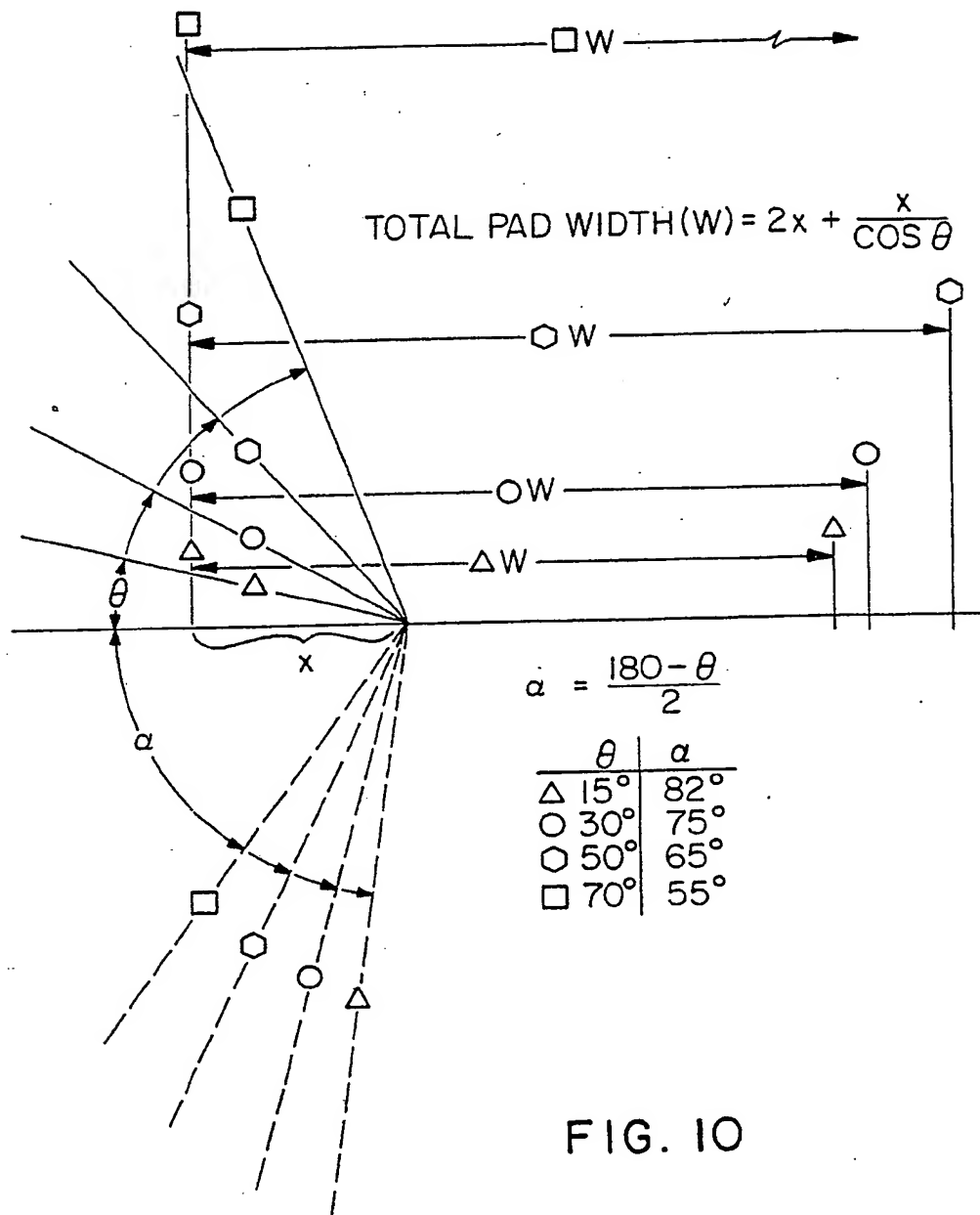


FIG. 9





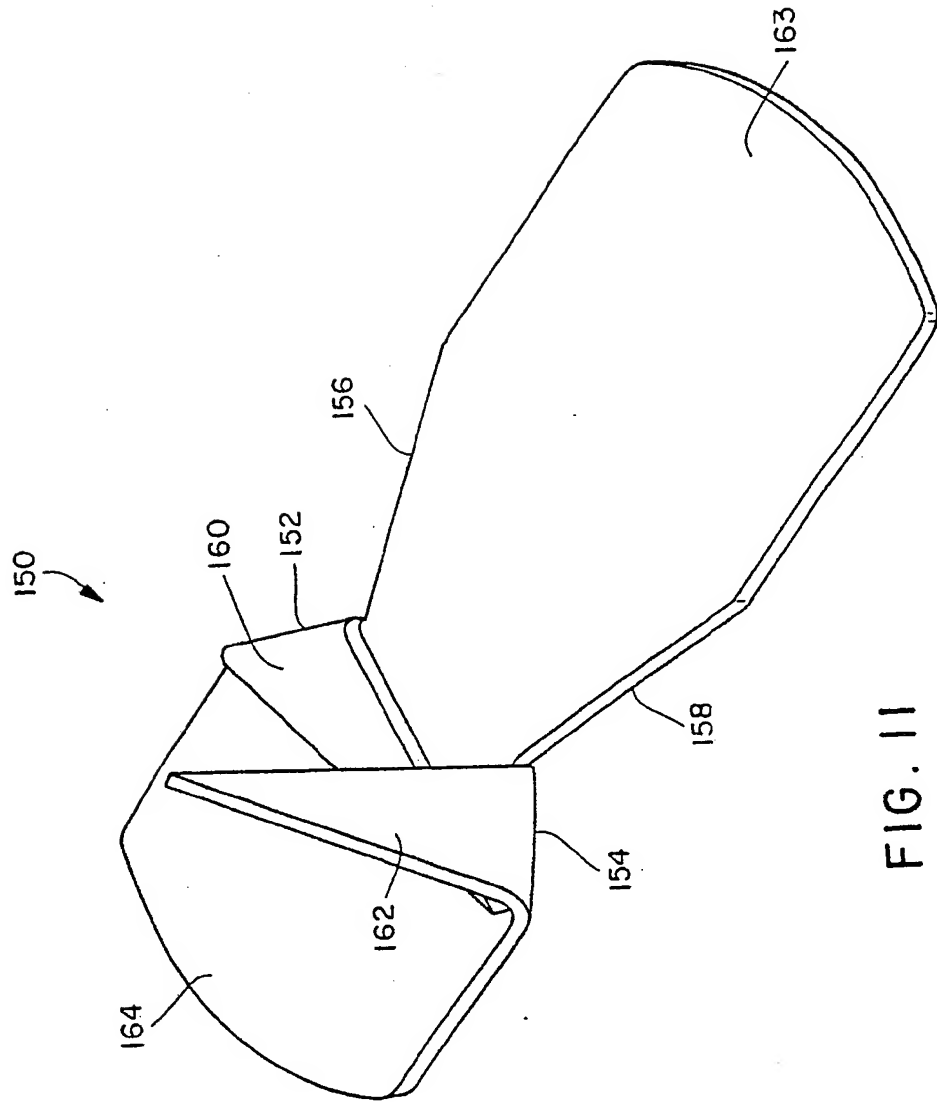


FIG. 11

## SPECIFICATION

## Absorbent pad

5 This invention relates to absorbent pads for external application. It more particularly relates to an elongated cup-shaped elasticized garment particularly adapted for use as a catamenial device or incontinence device.

10 The present invention relates to an absorbent product, such as a sanitary or incontinence napkin, comprising an absorbent body and a jacket enclosing said body, said jacket comprising a fluid-permeable layer located adjacent the user when in use and a fluid-impermeable layer disposed on the opposite side or back of the absorbent body.

Leakage to the side has been a problem when using previous incontinent, or sanitary napkins. Such leakage may be caused by shifting of the garment such that body exudate does not contact the garment. Another cause of leakage is the twisting of the garment such that the absorbent does not all face the body of the wearer and some of it is turned outward and may contact the clothing of the wearer. A third cause of side leakage is that the absorbent garment is not able to quickly absorb the gushes of liquid and such gushes run off the side of the garment prior to being absorbed.

Sanitary napkins of the older, uniformly thick types are often greatly deformed when used quite simply because they are too large and not fitted to the shape of the human body. They also are not resilient and deform as the body of the wearer moves. Usually they are pressed together in the middle and bent along a longitudinal axis so that the front, the side in contact with the user, becomes convex with portions of the fluid-permeable layer facing out towards the sides at the same time as the fluid-impermeable back layer is more or less folded up resulting in a reduction in effective fluid-stopping surface. This means that fluid from the napkins can leak through the folded out fluid-permeable front layer on both sides of the folded-up fluid-impermeable back layer. Leakage also is caused by the folding and shifting movement of the pad.

Attempts have been made to solve this problem by making the modern sanitary napkins so that when used they more closely follow the shape of the body and have their greatest absorption capacity where the need is greatest.

The modern sanitary napkins are not deformed especially much during use and are more comfortable. However, side leakage is still a substantial problem even in body-shaped napkins. On occasions when fluid discharge is great, experience has shown that not all the fluid has time to be absorbed; rather a portion can still leak out to the sides and over the longitudinal edges of the napkin.

Developments of the last few years, however, have made the napkins thinner and thinner. This has been made possible both by compressing the absorbent material, and by using high-absorbent material. Examples of such very thin and comfortable napkins are the thin sanitary pads with highly absorbent materials instead of sanitary napkins of the older thicker types.

For such thin napkins, side leakage is a problem as pads do not conform to the body. Since they are usually very thin, they must be relatively broad even in the middle, making them liable to be greatly deformed when used, unfortunately often resulting in edge leakage in this type of napkin as well.

Many different attempts have been made to eliminate the occurrence of lateral leakage. In thin napkins one example is to arrange a number of longitudinal compressed areas in the absorbent body for the purpose of rapidly spreading the fluid longitudinally. These compressed areas are, however, far from sufficient to satisfactorily eliminate edge leakage.

It is also known to further widen the fluid-impermeable back layer so as to cover, in addition to the back and side edges of the napkin, also a portion of the front side in contact with the user during use. In such a design the fluid already collected in the absorbent body is to be sure effectively enclosed.

There have been proposed shaped pads for use as catamenial or incontinence devices. European patent application 0091412-Widlund discloses an elastic edged shaped pad. The pad of Widlund has elastic along the edges of the center portion of a generally rectangular pad. The elastic serves to shape the pad into a bowed shape with the elasticized edges extending upward. Great Britain patent application 2,142,541-Buell discloses an elasticized waste containment garment, designed for incontinence use. This garment also has elasticized edges. In the Buell application the elastic extends almost the full length of the garment, and the elasticized edge portion not containing absorbent appears to be somewhat wider than that of Widlund. Other pads exhibiting elasticized edges are disclosed in European Patent Publication 0,167,931—Damico et al., European Patent Publication 0,164,435—Damico and U.K. Patent Publication 2,156,681—Mokry.

There remains a need for a pad that fits the curve of the human body, is stationary during use, is comfortable to wear, effective, particularly against side leakage and gushes of liquid, and discreet. Thinner, rectangular pads of the prior art are not of a shape that easily conforms to the body without bunching and being deformed. Therefore, there remains a need for an improved pad for catamenial use or for incontinence use.

An object of this invention is to avoid the disadvantages of prior devices for absorption

of bodily excretion.

Another object of the invention, at least in preferred embodiments, is to provide a catamenial or incontinence device which is able to handle gushes of liquids, which resists twisting, and which is discreet.

Viewed from one aspect the invention provides an absorbent pad comprising a liquid permeable bodyside liner, a liquid impermeable outer covering and a folded absorbent member between said covering and said liner, wherein said absorbent member has generally parallel sides, each of said sides being provided with an angled cut extending to an ending point forming a folding portion between said cut and the side where said cut originated, the respective ending points of the cuts being generally located on or adjacent a single line extending perpendicular to said sides of the member, each of said sides also being provided with a fold line extending from the side of said member to the respective cut ending point, the arrangement being such that when each side folding portion is folded inwardly along the respective fold line the portions overlap to provide the member with a triple thickness region of absorbent material.

A preferred incontinence or catamenial device includes a generally rectangular piece of absorbent that has been cut at carefully controlled angles such that when folded after cutting a narrow triple thickness area is formed that allows the pad to cup when the elastic in the edge relaxes and that in the preferred form tapers to a single thickness area in the rear of the pad. The pad also is provided with an elasticized area in the portion of the pad that has a narrower folded absorbent. The preferred pad has a triple thickness area forming a raised area with angled side trenches in the area where the sides are elasticized with the bottom portion of the trenches being in the area where the triple thickness narrow portion abruptly changes to the single thickness front portion.

Certain embodiments of the invention will now be described, by way of example only, with reference to the drawings, in which:

Figure 1 is perspective view of a pad in accordance with the invention.

Figure 2 is a side view of the pad in accordance with the invention.

Figure 3 is a top view of the pad in accordance with the invention.

Figure 4 is a bottom view of the pad of the invention.

Figure 5 is a cross sectional view of the pad of the invention on cross sectional line 5-5 of figure 3.

Figure 6 is a cross sectional view of the pad of the invention on the cross sectional lines 6-6 of figure 3.

Figure 7 is a cross sectional view of the pad in the invention on cross sectional line 7-7 of figure 3.

Figure 8 is a perspective view of the absorbent of a pad of the invention partially folded.

Figure 9 is a view of the absorbent of the pad in accordance with the invention in which cut lines and fold lines are identified.

Figure 10 is an illustration of the cut and fold lines for pads of various widths.

Figure 11 is a perspective view of an alternate cut and fold for an absorbent.

The instant invention has numerous advantages over prior absorbent pads. The pads of the invention have three layers of absorbent in the target area. The preferred pad of the invention as curved and shaped by the elastic, forms trenches at the sides and front with the middle of the target area raised to contact the perineum for a snug fit to allow fluid to transfer into the absorbent rather than follow skin folds. The invention also has the advantage there is no waste of absorbent in that the edges of a rectangular piece of absorbent are folded underneath to form the three layer portion. Another advantage is that the preferred pad of the invention resists bunching and twisting as it has a stronger crotch portion where the three portions of absorbent are folded and over-lap. Another advantage is that the pad leaks less than other designs as it is less subject to deformation, twisting and side leakage. These and other advantages of the invention will be apparent from the detailed description of the invention and drawings below.

As illustrated in Figure 1, the preferred pad of the invention 10 has a curved shape with the front portion 12 and a rear portion 14. The pad has elastic areas as indicated by lines 16 and 18. The pad is provided with areas outlined by lines 20 and 22 on each side of the target area that do not contain absorbent. The pad has a raised triple thickness center portion 24 and trench areas 26 and 28 on each side of the raised area 24. The pad is illustrated as sealed at the ends on lines 30 and 32. The pad is provided with impervious folded over edges 34 and 36.

The pad 10 is illustrated in side view in Figure 2 where the impervious backing sheet 38 is visible. As illustrated in the top view of Figure 3 the pad 10 has a general rectangular shape with the overlapping side portion 34 and 36. The target area has an upstanding portion 24 that is bordered by the trenches 26 and 28. The bottom Figure 6 indicates the adhesive bottom strips 39 and 40 covered by peelable strips 42 and 44. The adhesives 39 and 40 are provided for fastening the device to the garment of the wearer. The adhesive fastening could be by a single wide strip or a different number of strips than the two shown. However, the two separated long adhesive strips are preferred for best holding of the garment in place.

As illustrated in Figure 5, the cross section at the narrowest portion of the target area

illustrates the three layers of absorbent 46.

The three layers of absorbent have a top layer 48, middle layer 50, and the bottom layer 52. The cover member 54 is permeable to liquids.

- 5 The back cover 38 is not permeable to liquids although it may be vapor permeable. The edges 56 and 58 are gathered by the elastics 16 and 18 respectively. The permeable cover and backing material are connected at 60 and
- 10 62 by heat sealing or adhesive connection. The trenches 26 and 28 for channeling liquid and to hold gushes extend down into the trenches at the edges of the triple layer of absorbent. Figure 6 illustrates where absorbent
- 15 has resumed being a single layer after the folded layers have tapered back to being a single layer. Figure 7 illustrates a cross section at somewhat off longitudinal center of the pad of the invention illustrating the two fold
- 20 over portions 50 and 52 with the middle portion 48 forming a three layer structure that creates a raised portion 24 in the target area of the pad.

- Figure 8 is a perspective view of the absorbent 46 of the preferred pad of the invention. The absorbent 46 viewed from the bottom side away from the body has folding portions 50 and 52 that when folded result in the formation of a three layer structure. The forward edges 68 and 70 of the folded portions 52 and 50 substantially correspond after folding. They rest on a line generally perpendicular to a longitudinal line drawn down the center of absorbent 46 and further substantially correspond to a line perpendicular to the edges 72 and 74 of the absorbent 46. The cuts 76 and 78 end at points 80 and 82 where the fold lines 84 and 86 also end. The end points 88 and 90 of portions 50 and 52 after folding are located adjacent points 82 and 80.

- Figure 9 identifies the angles to be considered when performing the cuts in absorbent pad 100 to fold it in accordance with the preferred embodiments of invention. The pad 100 is to have a forward portion 102 and rearward portion 104. The pad is illustrated as marked with a longitudinal center line 106 and a line 108 perpendicular to the parallel sides 110 and 112 of the pad 100. The cut lines 114 and 116 and fold lines 118 and 120 meet at point 122 and 124 on a line 108 perpendicular to the sides of the pad. The cut lines 114 and 116 intersect fold lines 118 and 120 at points 122 and 124. The angle between lines 108 and cut lines 114 and 116 is identified as theta  $\theta$ . The angle between the fold lines 118 and 120 and the line perpendicular to the sides 108 is identified as angle alpha ( $\alpha$ ). The relationship between theta and alpha is identified by the following formula: alpha equals (180 minus theta) divided by 2. The total absorbent pad width has a relationship to the distance between points 122 and 124 and the edge of the pad 100 as indicated
- 65 as x. The total pad width (W) equals 2X plus

(X divided by the cosine of theta). As illustrations of the relationship between theta and alpha a pad having an theta of 15 degrees would have a alpha of 82 degrees. A pad of 30 degrees theta would have 36 degrees alpha, a pad of theta 50 degrees would have 65 degrees alpha, and a pad of 70 degrees theta would have a 55 degree alpha. These angle measurements allow the pad portion 128 bounded by cut line 114 and fold 118 and pad portion 130 bounded by the fold line 120 and cut line 116 to be folded such that point 132 will be adjacent point 122 and point 134 will be adjacent to point 124 where cut line 116 meets fold line 120. Further, the cut lines 116 and 114 will coincide with each other and with the perpendicular 108 after folding.

- Figure 10 illustrates by means of coded fold and cut lines the variations of cut and fold lines that may be utilized for forming pads with cut angle alpha of 15°, 30°, 50° and 70°. There is also a representation of the width of pads formed with various cuts and fold angles.

- It has somewhat surprisingly been found that the cut and fold lines as discussed above with respect to Figures 9 and 10 may be reversed to form an absorbent pad. By this it is meant that the cut lines become fold lines and the fold lines become cut lines. When this is accomplished, an absorbent 150 illustrated in Figure 11 as formed. The absorbent 150 is provided with fold lines 152 and 154. These folds are made after cutting on lines 156 and 158 from what was originally a generally rectangular piece. The overlapped pieces 160 and 162 are located in the front 164 of the absorbent ahead of the narrowest point. The longer rear portion 166 is not provided with any multiple absorbent layers as in this embodiment the multiple absorbent layers are in the front portion forward of the narrowest point. A pad with absorbent 150 as illustrated in Figure 11 is considered as suitable for male incontinence in that the triple thickness area is better able to absorb large quantities of urine that would be released onto the upper folded part of the pad by a male incontinent. This embodiment is considered less preferred as the crotch portion is not as strong as the narrowest part is not triple layered and therefore a pad with the absorbent 150 as illustrated would be somewhat more subject to twisting and bending.

- While the preferred invention has been illustrated and primarily discussed for use as a catamenial device, it also finds utility for use as an incontinence device of smaller size for mild incontinence or as larger devices such as the loin cloth type incontinent garments described in European patent application 0,164,435—Damico and U.S. 4,315,508—Bolick.

- 130 The high absorbency of the crotch area

combined with its resistance to deformation also has utility in these larger garments. Such larger garments can be supported either by straps or garment attachment adhesives as illustrated above.

The liquid impervious backing sheet member of the invention may be made of any suitable material that does not allow the passage of aqueous liquids. Typical of such material are sheets of polyethylene, polypropylene and other polymer and copolymer materials. A preferred material is a sheet formed by extrusion of polyethylene onto a spunbonded fabric material. The spunbonded material is formed by spinning of fine continuous filaments of polypropylene onto a moving belt. The co-extruded sheet is formed by extrusion of a very thin layer of polyethylene polymer onto the spunbonded fabric. This material is very light in weight and low in cost as the polymer film thickness is quite thin. Further, in the preferred construction the backing sheet is folded onto the body side at the edges to form baffles. The baffles being in contact with the skin are more comfortable with the cloth being exposed rather than the polymer sheet. The polymer sheet, without a cloth-like surface, when contacting the skin is more likely to cause reddening, abrasion, and deterioration of the skin. However, the plain polymer sheet could be used if a lower-cost product is desired. A vapor permeable liquid impermeable sheet may be used for a more comfortable pad.

The absorbent material may be any of many well-known absorbents. Typical of such absorbent material is fluff formed of delvlicated wood fibers, meltblown fibers such as polypropylene, carded webs of polyester, rayon and cotton and combination of the above materials with superabsorbents. A preferred absorbent is coform nonwoven fabric absorbent sheets. Coform is an air-formed combination of delvlicated wood fibers and meltblown polymer, normally polypropylene. This material is found to have high integrity and absorbency when present in a thin pad. The strength and wet integrity of the coform absorbent also adds to the strength and resistance to twisting of the pad. The formation of coform is disclosed in U.S. 4,100,324 Anderson et al. that is hereby incorporated by reference. The use of a coform material also containing superabsorbent, such as disclosed in UK Patent Pub. 2,113,731 of August 10, 1983, is particularly desirable in view of its light-weight and thinness of the superabsorbent containing coform in combination with its very high absorbency.

The garment of the invention may be designed to hold any desired amount of fluid by selection of appropriate amounts and types of absorbents. For catamenial use the pad may have absorbency between about 10 and 25 cc of aqueous fluid. It is preferred for mild

incontinence use that the pad be able to rapidly absorb and retain between about 20 and about 60 cc of aqueous fluid. Mild incontinence, generally refers to those persons having stress incontinence where small quantities of urine may be lost when an activity such as sneezing or laughing is performed and also to those persons with a more or less constant dribble of urine. A pad with the specified absorbency is suitable for such incontinence problems. Large undergarments for severe incontinence use may have an absorbency of several hundred cubic centimeters of aqueous fluid.

The pervious liner material may be of any known absorbent material for absorbent pad use that is nonirritating to the skin of the wearer and will easily pass fluids but not absorb them. Typical of such material are perforated polymer sheets, tissue, nonwoven fabrics, combinations of permeable materials in layers or permeable layers with transfer layers. A preferred material would be a spunbond layer combined with carded web such as disclosed in U.S. 4,397,644—Mathews et al. A suitable material is spunbonded polypropylene fabric sheet. A spunbonded polypropylene treated with a wetting agent or surfactant to make it hydrophilic is also suitable. The pervious liner may be wrapped around the impervious backing material and absorbent or may be glued on top of baffles 18 in some methods of construction of the pad.

The elastic in the pads of the invention generally will be enclosed in the folded over backing material as illustrated. The elastic is adhesively connected to the backing material when in extended condition and then released shrink to shape the pad and provide resilient edges. However, it is also possible that the elastic could be fastened onto the back of the backing material. It is also possible that rather than use elastic the shaping of the pads could be carried out by utilization of impermeable backing material that is formed of a molded foam plastic such as the ethylene polymer foam disclosed in U.S. 4,554,191—Korpman. The shaping of the pad also could be carried out by placing a heat shrinkable non-elastic member or heat shrinkable elastic into the area where the elastic is shown and then shrinking that piece. Pads formed of molded foam plastic or of heat shrunk non-elastic members are considered to be somewhat less preferred than elasticized pads as they do not have as great an ability to conform with the body. Further, elastomeric outer sheets could be utilized to improve fit or to substitute for added elastic.

The pad may be held in place on the user either by the use of the garment attachment adhesive or by straps. Further, if a diaper-like garment was formed, the adhesive tape tabs such as to hold diaper-like garments in place on the wearer could be used.

While the pad of the invention has been described primarily for catamenial and incontinent uses, the pad also could serve as a bandage or wound dressing. It is considered as particularly well suited for use as a bandage on knees or elbows. Also, while the pad has been described to use in adult feminine products, it is also suitable for use as an incontinence device for men, infants or children.

- 10 The foregoing specification and drawings are intended to be illustrative and not exhaustive. Other variations and rearrangements of the absorbent pad of the invention are possible without departing from the scope of the invention as disclosed herein.

#### CLAIMS

1. An absorbent pad comprising a liquid permeable bodyside liner, a liquid impermeable outer covering and a folded absorbent member between said covering and said liner, wherein said absorbent member has generally parallel sides, each of said sides being provided with an angled cut extending to an ending point forming a folding portion between said cut and the side where said cut originated, the respective ending points of the cuts being generally located on or adjacent a single line extending perpendicular to said sides of the member, each of said sides also being provided with a fold line extending from the side of said member to the respective cut ending point, the arrangement being such that when each side folding portion is folded inwardly along the respective fold line the portions overlap to provide the member with a triple thickness region of absorbent material.

2. A pad as claimed in claim 1 wherein the respective angles between said cut and fold lines and said perpendicular line are such that the angle of the fold line  $\alpha$  equals  $(180^\circ \text{ minus the cut angle } (\theta)) \text{ divided by } 2$ .

3. A pad as claimed in claim 1 or 2 wherein the width of the absorbent member (W) is calculated by the formula  $W = 2X + X/\cos \theta$  where X = the distance from the inner end of the cut line to the edge of said member,  $\theta$  = the angle between the cut lines and the line perpendicular to the pad sides and passing through the end points of said cuts.

4. A pad as claimed in any preceding claim wherein the pad is further provided with elastic at the midportion of the side edges of said pad.

5. A pad as claimed in any preceding claim wherein said impermeable cover comprises an impermeable foam sheet.

6. A pad as claimed in any preceding claim wherein the narrowest area of said absorbent member is in the front one-half of said pad.

7. A pad as claimed in any preceding claim wherein said absorbent member comprises conform.

8. A pad as claimed in any preceding claim wherein the arrangement of folds and cuts is

such that the triple thickness area is formed rearwardly of said line perpendicular to the parallel edges and joining the end points.

9. A pad as claimed in claim 8 wherein said pad comprises a raised center and angled trenches extending to elasticized areas at the side of the pad.

10. A pad as claimed in claim 8 or 9 wherein said pad has a cupped shape with the bottom portion of said cup in the triple thickness area of said absorbent member where the folding portions overlap each other.

11. A pad as claimed in any of claims 1 to 7 wherein the arrangement of folds and cuts is such that the triple thickness area is formed forwardly of said line perpendicular to the parallel edges and joining the end points.

12. A pad as claimed in claim 11 wherein said cuts begin toward the rearward portion of said pad and extend forward.

13. A pad as claimed in claim 11 or 12 wherein said pad has a cupped shape.

14. A pad as claimed in claim 11, 12 or 13 wherein the area of triple thickness of said pad is forward of its narrowest portion.

15. A pad substantially as herein described with reference to Figures 1 to 10 of the drawings.

16. A pad substantially as herein described with reference to Figure 11 of the drawings.

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